REMARKS

Favorable reconsideration of this application in view of the remarks to follow is respectfully requested. Since the present Response raises no new issues, and in any event, places the application in better condition for consideration on appeal, entry thereof is respectfully requested under the provisions of 37 C.F.R. §1.116.

In the present Office Action, Claims 1-17 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over the combination of applicants' admitted prior art ("AAPA") in view of U.S. Patent No. 5,936,189 to Tsuchiaki ("Tsuchiaki") and further in view of ADEL S. SEDRA & KENNETH C. SMITH, MICROELECTRONIC CIRCUITS (4TH Ed 1998)("Sedra and Smith"). Applicants respectfully traverse the aforementioned §103 rejection in view of the following remarks.

Applicants submit that Claims 1-17 of the present application are not obvious from the applied references or the AAPA since none of the references teaches or suggests applicants' claimed method or structure which includes providing a heterojunction bipolar transistor structure comprising at least an underlying SiGe base region, an insulator formed on surface portions of said underlying SiGe base region, and an emitter formed on said insulator layer and in contact with said underlying SiGe base region through an emitter opening formed in the insulator layer. A conformal passivation layer is then formed on the exposed sidewalls of the emitter, insulator layer, and a portion of the SiGe base regions. The exposed silicon regions not covered by the passivation layer are then silicided.

Applicants submit that the primary reference, the AAPA as depicted in FIG 1, fails to teach or suggest a conformal passivation layer. The AAPA discloses a

heterojunction bipolar transistor structure, which does not incorporate the conformal passivation layer. The heterojunction bipolar transistor structure as disclosed in the AAPA typically results in a 20-30% bipolar yield loss. The loss associated with the SiGe bipolar transistor structure, as disclosed in the AAPA, is attributed to the presence of silicide bridges between the emitter and SiGe body, which introduce shorts to the structure during silicidation. Applicants' claimed method and structure utilize the conformal passivation layer to avoid the formation of silicide bridges and losses associated with prior art devices.

The above deficiencies in the AAPA are not alleviated by the disclosure of Tsuchiaki since the applied reference does not teach or suggest a final device structure including a conformal passivation layer positioned on the exposed sidewalls of an emitter, a patterned insulator layer and a portion of a SiGe base region; and silicide regions which are located on exposed portions of a SiGe layer, including portions of the SiGe base region and the emitter not covered by the conformal passivation layer.

Applicants submit Tsuchiaki fails to teach or suggest a final SiGe bipolar transistor structure incorporating a conformal passivation layer, wherein the conformal passivation layer decreases the incidence of silicide bridges by protecting the surfaces underlying the passivation layer from being silicided. "To establish a prima facie case of obviousness of a claimed invention all the claimed limitations must be taught or suggested by the prior art" In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 44, 496 (CCPA 1970).

Tsuchiaki provides a passivation layer that is only utilized as an etch stop in the formation of a MOSFET device. Once the etch steps have been completed, the

passivation layer is then removed and consequently does not remain as a structural component of the final device. Therefore, Tsuchiaki does not teach or suggest all of the limitations of the applicants' final structure recited in Claim 9.

Additionally, Tsuchiaki does not teach or suggest silicide formation or the use of a passivation layer during silicide formation and therefore fails to teach or suggest all of the limitations of applicants' method as recited in Claim 1. Claim 1 recites forming a passivation layer on said exposed sidewalls of said emitter, said insulator layer and portions of said SiGe base; and siliciding exposed Si surfaces of at least said emitter and said SiGe base region not protected by said passivation layer to form silicide regions therein. Tsuchiaki only discloses using the passivation layer as an etch stop barrier and therefore does not teach or suggest siliciding the exposed Si containing surfaces, of the emitter and the SiGe body, not underlying the conformal passivation layer as recited in Claim 1. Therefore, Tsuchiaki fails to teach or suggest applicants' method recited in Claim 1.

Tsuchiaki as a whole teaches away from the applicants' invention. "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983). Tsuchiaki, referring to Column 7, line 5, specifically teaches a passivation layer for the purpose of an etch stop during a selective etch step, where after the etch step is concluded the passivation layer is removed, therefore teaching away from the applicants' claimed structure comprising a passivation layer that remains in the final structure of the device. Tsuchiaki teaches away from applicants' method and structure recited in Claims 1 and 9.

Sedra and Smith, do not fulfill the deficiencies of the AAPA and the Tsuchiaki reference. Sedra and Smith, referring to page 222, disclose a bipolar junction transistor consisting of three semiconductor regions; the emitter, the base region, and the collector region. Sedra and Smith fail to teach or suggest a conformal passivation layer as recited in amended Claims 1 and 9.

The §103 rejection also fails because there is no motivation to modify the prior art structures to include applicants' claimed method and structure, where a passivation layer defines the locations where silicide regions contact the SiGe layer and surface of the emitter, as recited in Claims 1 and 9. The §103 rejection is thus improper since the prior art does not suggest this dramatic modification.

The law requires that a prior art reference provide some teaching, suggestion or motivation to make the modification. In re Vaeck, 947 F.2d 488, 493, 20 USPQ 2d 1438, 1442 (Fed. Cir. 1991). "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. "In re Fritch, 972 F.2d 1260, 1266, 23 USPQ 2d 1780, 1783-84 (Fed. Cir. 1992).

Referring to page 5 of the current Office Action, the Examiner contends that the suggestion to combine the above references is that it is within the knowledge generally available to one of ordinary skill in the art to remove the silicide regions and replace them with a passivation region in the joint areas of the emitter and base in order to further isolate the emitter and the base contacts so there would be no shorts between base and emitter.

A statement that modifications of the prior art to meet the claimed invention would have been " ' well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima fascia case of obviousness without some objective reason to combine the teachings of the references. Ex Parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. and Inter. 1993).

Applicants submit that the Examiner has gleaned knowledge from applicants' disclosure to provide an objective reason for combining the AAPA with the above references to include the structure and method recited in Claims 1 and 9. The teaching or suggestion to make the claimed combination must be found in the prior art and not based on applicant's disclosure. See In re Vaeck, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991).

First, a major problem with the prior art SiGe heterojunction bipolar transistors is that the SiGe bipolar yield is significantly reduced because of the presence of shorts which are introduced into the structure during the silicide process. The shorts are caused by the presence of silicide bridges that exist in the structure. As such, a 20-30% yield loss is typically associated with prior art SiGe heterojunction bipolar transistors. Applicants' inventive method and structure have alleviated the above by incorporating a conformal passivation region, which does not allow the formation of silicide bridges. Applicants' disclosure is the only teaching for utilizing a passivation layer in a manner that would alleviate shorting during silicidation and silicon bridge formation.

Second, as discussed above, the AAPA and Sedra and Smith do not teach or suggest a conformal passivation layer. The passivation layer disclosed in Tsuchiaki is removed before the structure of the device is completed and it utilized for a totally different purpose than the conformal passivation layer recited in the applicants' claims. Additionally, Tsuchiaki teaches away from applicants' invention because it discloses the passivation layer as an etch stop that is removed before device finalization and does not address silicidation or shorting due to silicide bridge formation. Further, none of the applied references addresses silicide formation, or more importantly reducing the silicide bridge formation. The applied references do not teach or suggest incorporating a conformal passivation layer as recited in Claims 1 and 9.

Applicants respectfully submit a prima facie case of obviousness based on modifications being well within the ordinary skill of the art can not be supported by the objective reasoning to combine the teachings because the Examiner has impermissibly gleaned the objective reasoning to combine the applied references from the applicants' disclosure. "A piecemeal reconstruction of the prior art patents in the light of the applicants' disclosure shall not be the basis for a holding of obviousness." In re Rothermel, 47 CCPA 866, 276 F.2d 393, 396, 125 U.S.P.Q. 328, 331 (1960). "It is impermissible within the framework of §103 to pick and choose from any one reference only as much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggest to one of ordinary skill in the art". In re Wesslau, U.S.P.Q. 391, 393 (1965).

There is no suggestion in the prior art of applicants' claimed method or structure recited in pending Claims 1-17. As such, the claims of the instant application are not

obvious from any of the above-mentioned prior art references. Therefore, applicants respectfully submit that the rejection under 35 U.S.C. §103 has been obviated; and the withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

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